

Section III – Mitigation Strategies and Policies

A. PROCESS

The Advisory Committee reformulated eight (8) goals that will be put into action through the use of mitigation strategies and policies. The first step was to evaluate and update the mitigation strategies already assigned to each goal. NCEM has divided the strategies into five (5) categories. These categories are described below.

1. **Prevention** strategies keep hazards from worsening, usually by reducing future vulnerability in currently undeveloped areas. They include policies in the areas of planning, zoning, open space preservation, floodplain regulation, stormwater management, and capital improvements.
2. **Property protection** strategies safeguard existing structures through modification or removal from hazardous locations. They include relocation, acquisition, modification of building elevations, windproofing, and floodproofing.
3. **Natural resource protection** strategies reduce impacts of hazards by preserving or restoring areas that naturally mitigate hazards, such as floodplains. Floodplain protection and greenway system development are examples of natural resource protection strategies.
4. **Structural** strategies include projects designed to lessen the impacts of hazards. Examples are reservoirs, levees, diversions, channel modifications, and storm sewer systems.
5. **Public information** strategies advise the public about hazards and give ways to lessen impacts due to the hazards. They include outreach projects, production of hazard maps, warning systems, hazard disclosure for real estate transactions, technical assistance, and educational programs for school children.

As mitigation strategies for each goal were evaluated and updated, the Advisory Committee reviewed the mitigation policies for carrying out the strategies. In



order to be considered for inclusion in the Mitigation Action Plan, each policy had to be cost-effective, feasible, and not harmful to the environment. The implementation process, including potential funding sources, the department responsible for implementation, and target completion date, was also re-evaluated for each policy. Evaluation indicators were established so that the effectiveness of each policy could be monitored, and the priority for each policy was given.



B. MITIGATION ACTION TABLE

The Mitigation Action Table, which follows as Table III-1 lists each goal, policy, and action item; designates whether the policy is new, a continuation of an existing policy or change in an existing policy; and lists the hazards targeted, funding source, responsible party, and target completion date. Monitoring/evaluation indicators are listed for each policy. These indicators will be assessed in preparation of the plan maintenance report, as described in Section IV.

Goal/Objective	Action Item	New Policy, Continuation, Or Change	Strategy Type	Hazard(s) Targeted	Funding Source(s)	Responsible Party	Target Completion Date	Monitoring/ Evaluation Indicators	Priority
1. Generally reduce the impact of all hazards									
Hazard Mitigation Plan	Adopt Hazard Mitigation Plan & Updates	Continuation	Prevention	All	Internal, HGMP	Town Council	Upon approval by FEMA	Verify that Plan was adopted – Initial Plan approved by FEMA on August 27, 2004; after being adopted by Town Council on July 6, 2004	High
	Prepare Plan Maintenance Report	Continuation	Prevention	All	Internal	Planning	Annually	Verify that report was prepared	High
	Prepare updates to Plan	Continuation	Prevention	All	Internal	Planning & Advisory Committee	As needed	Determine if updates were needed and made – Advisory Committee meets from late 2008 to early 2009 to prepare plan updates	High
	Revise Hazard Mitigation Plan	Continuation	Prevention	All	Internal	Planning & Advisory Committee	Every five years	Verify that Plan was revised – Revised plan submitted to NCEM in February 2009	High
Maintain Critical Facilities and Infrastructure	Keep evacuation routes open	Continuation	Prevention	All	Internal	Public Works & Public Safety	Ongoing	Determine if evacuation routes are passable	High
	Maintain water supply system, including generators at booster plant	Continuation	Prevention	All	Internal	City of Raleigh Public Utilities	Ongoing	Verify that quantity meets requirements, generators are operational	High
	Maintain sewer lift stations, including generators	Continuation	Prevention	All	Internal	City of Raleigh Public Utilities	Ongoing	Verify that lift stations function as designed, generators are operational	High
Improve emergency response	Update Emergency Response Plan	Change	Prevention	All	Internal	Public Safety	December 31, 2009	Verify that plan has been updated – Last plan update completed in Spring 2008	High



Goal/Objective	Action Item	New Policy, Continuation, Or Change	Strategy Type	Hazard(s) Targeted	Funding Source(s)	Responsible Party	Target Completion Date	Monitoring/ Evaluation Indicators	Priority
2. Establish plans for public education and outreach									
Inform citizens about natural hazards	Distribute “Ready Wake” brochures in libraries, Town Hall, public places and on the Town Web Site.	New	Public information	All	Internal	Administration	Ongoing	Verify that brochures were distributed and posted on the web.	Moderate
	Inform public of construction requirements in hazard areas	Continuation (Chp. 6, UDO)	Public information	All	Internal	Building/Inspections	Ongoing	Verify that construction requirements were given to public	Moderate
	Require disclosure of flood hazard in real estate transactions	Continuation	Public information	Flood	Internal	Planning	Ongoing	Verify that disclosure of hazard potential was made	Moderate
Involve public in Hazard Mitigation planning process	Present Plan at public meeting	New	Public information	All	Internal, HGMP	Planning	November 2009	Verify that public meeting was held	Moderate
	Post plan maintenance report for public comment	New	Public information	All	Internal	Administration	Annually	Verify that report was posted	Moderate
	Post copy of Plan on website, in Town Hall	New	Public information	All	Internal	Planning	Upon approval by FEMA	Verify that Plan was posted	Moderate
3. Specifically reduce the impact of flooding									
Inform property owners of flooding risk	Monitor areas known to flood. Directly contact affected property owners by phone or in person.	Continuation	Public Education	Flooding	Internal	Town Engineer, Public Works	Ongoing	Conduct post-event meeting to review and document Town response.	Low
	Make flood maps available to the public	Continuation	Public information	Flooding	Internal	Planning	Ongoing	Determine if maps are available	Moderate
Discourage development in flood-prone areas	Enforce UDO standards for development in flood hazard areas	Continuation	Prevention	Flooding	Internal	Planning, Inspections	Ongoing	Track development in flood hazard areas	High
	Prohibit development less than two (2) feet above BFE	Continuation (UDO Section 6.5D)	Prevention	Flooding	Internal	Planning	Ongoing	Verify all floodplain development permit requirements have been met.	High



Goal/Objective	Action Item	New Policy, Continuation, Or Change	Strategy Type	Hazard(s) Targeted	Funding Source(s)	Responsible Party	Target Completion Date	Monitoring/ Evaluation Indicators	Priority
	Complete stormwater management plan and institute stormwater management program	Continuation (NPDES Phase II permit)	Prevention	Flooding	Internal	Public Works & Engineering	5 years from receipt of NPDES Stormwater Phase II permit	Verify that plan was implemented and budget established for program	High
Mitigate Flood Damage to Existing Structures in Flood Hazard Areas	Pursue Grants to Acquire, Elevate and or Relocate Flood Prone Structures and Property	New Policy	Prevention	Flooding	Internal, FEMA, NCEM	Planning	Ongoing	Monitor when Grants are to be submitted	High
	Require Floodproofing and/or removal of Structures requesting substantial improvements	Continuation (UDO Section 6.5D2b)	Prevention	Flooding	Internal	Planning, Inspections	Ongoing	Track developments in flood hazard area and inspect structures affected after flooding events	High
	Maintain list of all structures located within the floodplain	Continuation	Prevention	Flooding	Internal	Planning	December 2010	Track number of structures in floodplain	High



Goal/Objective	Action Item	New Policy, Continuation, Or Change	Strategy Type	Hazard(s) Targeted	Funding Source(s)	Responsible Party	Target Completion Date	Monitoring/ Evaluation Indicators	Priority
4. Specifically reduce the impact of hurricanes									
Educate public about hurricanes	Distribute “Ready Wake” storm preparation brochures and post on the Town website.	Continuation	Public Education	Hurricane	Internal	Administration	December 2009	Verify that brochures were distributed and posted on website	Low
Reduce impacts to power lines and structures	Require burial of power lines for new developments	Continuation	Prevention	Hurricanes, Tornadoes, Winter Storms/Freezes	Private	Planning	Ongoing	Verify that underground power is installed in new developments	Moderate
	Require new construction to comply with wind section of Building Code	Continuation	Prevention	Hurricanes, Tornadoes	Internal	Inspections	Ongoing	Verify that construction complies with Code	High
Speed hurricane recovery process	Establish post-disaster clean-up procedures	Continuation	Prevention	Hurricanes, Tornadoes, Winter Storms/Freezes	Internal	Public Works	July 2010	Verify that post-disaster clean-up plan is maintained and that contracts are in place with national disaster response organizations.	High
	Prepare debris removal and disposal plan	Continuation	Prevention	Hurricanes, Tornadoes, Winter Storms/Freezes	Internal, FEMA, NCEM	Public Works	July 2010	Maintain debris disposal plan and verify contracts are in place with national disaster response organizations.	Moderate
5. Specifically reduce the impact of tornadoes and severe thunderstorms									
Educate public about tornadoes and severe thunderstorms	Distribute “Ready Wake” storm preparation brochures and post on the Town website.	Continuation	Public Education	Tornadoes/ Severe Thunder-storms	Internal	Administration	December 2009	Verify that brochures were distributed and are available on website.	Low



Goal/Objective	Action Item	New Policy, Continuation, Or Change	Strategy Type	Hazard(s) Targeted	Funding Source(s)	Responsible Party	Target Completion Date	Monitoring/ Evaluation Indicators	Priority
Reduce impacts to power lines and structures	Require burial of power lines for new developments	Continuation	Prevention	Hurricanes, Tornadoes, Winter Storms/Freezes	Private	Planning	Ongoing	Verify that underground power is installed in new developments	Moderate
	Require new construction to comply with wind section of Building Code	Continuation	Prevention	Hurricanes, Tornadoes	Internal	Inspections	Ongoing	Verify that construction complies with Code	High
Speed tornado recovery process	Establish post-disaster clean-up procedures	Continuation	Prevention	Hurricanes, Tornadoes, Winter Storms/Freezes	Internal	Public Works	July 2010	Verify that post-disaster clean-up plan is maintained and that contracts are in place with national disaster response organizations.	High
	Prepare debris removal and disposal plan	Continuation	Prevention	Hurricanes, Tornadoes, Winter Storms/Freezes	Internal, FEMA, NCEM	Public Works	July 2010	Maintain debris disposal plan and verify contracts are in place with national disaster response organizations.	Moderate

6. Specifically reduce the impact of winter storms/freezes									
Educate public about winter storms/freezes	Distribute “Ready Wake” storm prep brochures and post on the Town’s website	Continuation	Public Education	Winter Storms/freezes	Internal	Administration	December 2009	Verify that brochures were distributed and available on website	Low
Reduce impacts to power lines and structures	Require burial of power lines for new developments	Continuation	Prevention	Hurricanes, Tornadoes, Winter Storms/Freezes	Private	Planning	Ongoing	Verify that underground power is installed in new developments	Moderate
	Require new construction to comply with snow load requirements of Building Code	Continuation	Prevention	Winter Storms/Freezes	Internal	Inspections	Ongoing	Verify that construction complies with Code	High
Speed winter storm recovery process	Establish post-disaster clean-up procedures	Continuation	Prevention	Hurricanes, Tornadoes, Winter Storms/Freezes	Internal	Public Works	July 2010	Verify that post-disaster clean-up plan is maintained and that contracts are in place with national disaster response organizations.	High
	Prepare debris removal and disposal plan	Continuation	Prevention	Hurricanes, Tornadoes, Winter Storms/Freezes	Internal, FEMA, NCEM	Public Works	July 2010	Maintain debris disposal plan and verify contracts are in place with national disaster response organizations.	Moderate



7. Improve technical capability									
Improve use of email communication capabilities	Utilize electronic newsletter to keep citizens informed	New	Public Education	All	Internal	Administration	Ongoing	Verify that weekly electronic newsletter keeps Town hazard prevention and mitigation information current	Low
Increase information available on website	Keep website updated with latest storm and emergency response information	Continuation	Public Education	All	Internal	Administration	Ongoing	Verify that information of on the website is current	Low

8. Specifically reduce the impact of drought									
Increase the area's water supply	Complete the Dempsey E. Benton Water Treatment Plant	New	Prevention	Drought	Internal	City of Raleigh Public Utilities	February 2010	Verify that water treatment plant is constructed and operational	High
	Protect and Obtain Land for the Little River Reservoir	New	Prevention & Property Protection	Drought	Internal	City of Raleigh Public Utilities	Ongoing with completion of reservoir in 2020	Monitor the success of getting interlocal agreements signed that aim to protect the land needed for the reservoir as it currently involves six (6) separate local government units	Moderate
Increase information available on website	Keep website updated with latest information on drought, water restrictions and water conservation techniques	New	Public Education	Drought	Internal	Administration	Ongoing	Verify that information on the website is current	Low



C. MITIGATION POLICY NARRATIVE

The following narrative describes the mitigation strategies and policies proposed for each goal.

Goal 1: Generally reduce the impact of all hazards.

The first goal formulated by the Advisory Committee is to generally reduce the impact of all hazards. The mitigation objectives proposed in order to achieve this goal include preparation of Hazard Mitigation Plan updates, maintenance of critical facilities, and improvement of emergency response. All of the strategies can be categorized as prevention strategies. All of the objectives are being funded internally, and most of them involve the continuation of existing Town policies. The objectives associated with this goal are of highest priority.

Goal 2: Establish plans for public education and outreach.

The second goal is to establish plans for public education and outreach. The mitigation objectives proposed in order to achieve this goal include informing the public about natural hazards and involving the public in the Hazard Mitigation planning process. All of the strategies associated with this goal are categorized as public information strategies. Most of the public information addresses all hazards and the entire jurisdictional area of the Town, although information on construction requirements according to the building code and disclosure of hazard potential in real estate transactions relate specifically to particular hazards. All of the objectives are being funded internally, and most of them involve the continuation of existing Town policies.

The Town of Knightdale has a website as well as a weekly electronic newsletter ("e-Views") which are excellent sources of information for its residents. In addition to giving general information about the Town, they provide links to weather information, storm tracking information, and hazard preparation information for its residents and emergency response workers. It can be accessed at the following address: "<http://www.knightdalnc.gov>".



Goal 3: Specifically reduce the impact of flooding.

The third goal is to specifically reduce the impact of flooding. The mitigation objectives proposed to achieve this goal address the hazard of flooding in floodplains as defined by FEMA and shown on Flood Insurance Rate Maps for Wake County. They include informing the public of the risk of flooding; discouraging development in flood-prone areas; and elevation, acquisition, or relocation of existing structures in flood-prone areas. Public education, prevention, property protection, and natural resource protection strategies are associated with this goal. Funding for all of the objectives is internal with the exception of the new policy on structure elevation, acquisition, or relocation. Grants will be pursued in order to complete this objective.

The Town of Knightdale currently has regulations in place to restrict development in the floodplain. These regulations have been effective in limiting development in flood-prone areas to date. Also, the Town is currently preparing a stormwater management plan along with preparing to implement a stormwater management program as called for by the Town's NPDED Phase II Permit. It is anticipated that some of the projects identified by this plan will reduce the impact of flooding. Finally, the Town proposes to be proactive in reducing damages to existing structures located within flood hazard areas. To do this, the Town will maintain a list of all structures located within the flood plain, strictly enforce the flood ordinance as it deals with substantial improvements to these structures, and actively pursue grants to acquire, elevate or relocate these structures. Currently, the Town does not have any repetitive loss structures as classified by FEMA. However, according to a 2005 FIRM Survey, the Town identified 31 residential structures in the floodplain; however, it is likely that most if not all are built above the local BFE.

Goal 4. Specifically reduce the impact of hurricanes.

The fourth goal is to specifically reduce the impact of hurricanes. The mitigation objectives proposed in order to achieve this goal include educating the public about hurricanes and implementing plans to speed the recovery process after a hurricane. Hurricanes are not geographically defined; therefore, the objectives will apply to the entire jurisdictional area of the Town. Strategies associated with this goal are categorized as public information and prevention strategies.



Funding for the majority of these objectives is internal, with the exception of private funding for burial of power lines in new developments.

Hurricane impacts to Knightdale historically have included loss of power and destruction of property resulting in debris that has to be removed and disposed. Although burial of all power lines within the Town's jurisdiction would be prohibitively expensive, the Town can require that all new developments install underground power lines, which should minimize repairs necessary to restore power. In addition, the existence of a debris removal and disposal plan along with contracted disaster clean up companies will provide Knightdale with a means to quickly mobilize cleanup crews, prioritize critical areas for debris removal, and provide a cost-effective manner for processing vegetative debris.

Goal 5. Specifically reduce the impact of tornadoes and severe thunderstorms.

The fifth goal is to specifically reduce the impact of tornadoes and severe thunderstorms. The mitigation objectives proposed in order to achieve this goal include educating the public about tornadoes and severe thunderstorms, reducing impacts to power lines and structures, and implementing plans to speed the recovery process after a tornado or severe thunderstorm. Tornadoes and severe thunderstorms are not geographically defined; therefore, the objectives will apply to the entire jurisdictional area of the Town. Strategies associated with this goal are categorized as public information and prevention strategies. Funding for the majority of these objectives is internal, with the exception of private funding for burial of power lines in new developments.

Tornado and severe thunderstorm impacts to Knightdale are expected to include loss of power and destruction of property resulting in debris that has to be removed and disposed of. Although burial of all power lines within the Town's jurisdiction would be prohibitively expensive, the Town can require that all new developments install underground power lines, which should minimize repairs necessary to restore powers. The preparation of a debris removal and disposal plan will provide Knightdale with a means to quickly mobilize cleanup crews, prioritize critical areas for debris removal, and provide a cost-effective manner for processing vegetative debris.



Goal 6. Specifically reduce the impact of winter storms and freezes.

The sixth goal is to specifically reduce the impact of winter storms and freezes. The mitigation objectives proposed in order to achieve this goal include educating the public about winter storms and freezes, reducing impacts to power lines and structures, and implementing plans to speed the recovery process after a winter storm. Winter storms are not geographically defined; therefore, the objectives will apply to the entire jurisdictional area of the Town. Strategies associated with this goal are categorized as public information and prevention strategies. Funding for the majority of these objectives is internal, with the exception of private funding for burial of power lines in new developments.

Severe winter storm impacts to Knightdale historically have included loss of power and destruction of property resulting in debris that has to be removed and disposed of. Although burial of all power lines within the Town's jurisdiction would be prohibitively expensive, the Town can require that all new developments install underground power lines, which should minimize repairs necessary to restore powers. The preparation of a debris removal and disposal plan will provide Knightdale with a means to quickly mobilize cleanup crews, prioritize critical areas for debris removal, and provide a cost-effective manner for processing vegetative debris.

Goal 7. Improve technical capability.

The seventh goal is to improve the technical capability of the Town. The mitigation objectives proposed in order to achieve this goal include increasing the information available on the Town's website and the Town's electronic newsletter. Strategies associated with this goal are categorized as public information strategies.

The community capability assessment included an evaluation of the Town's technical capability. Knightdale has a Town website and electronic newsletter, both of which are beneficial to Town staff and residents, however improvements could be made. The Town's website and electronic newsletter should be updated whenever necessary to ensure that the latest storm and emergency response information as well as hazard prevention education materials are available to residents who access them.



Goal 8. Specifically reduce the impact of drought.

The eighth goal is to specifically reduce the impact drought. The mitigation objectives proposed in order to achieve this goal include educating the public about drought and water conservation, and increasing the regional potable water supply. Droughts are not geographically defined; therefore, the objectives will apply to the entire jurisdictional area of the Town. Strategies associated with this goal are categorized as public information, property protection and prevention strategies. Funding for these objectives is internal to either the Town of Knightdale or the City of Raleigh.

Drought impacts to Knightdale historically have included the restriction of various types of water usage. Although water cannot completely be cut off for essential services and uses, the Town can encourage water conservation techniques such as rain barrels, watering at night or in the early morning or installing water saving device on sinks and toilets which will help to stretch the regional water supply and help citizens and communities stave off the severity of an exceptional drought such as the one experienced throughout the region in 2007 and 2008.

D. IMPLEMENTATION THROUGH EXISTING POLICIES

As noted above, many of the objectives associated with the goals for the Hazard Mitigation Plan will be implemented through revisions and/or additions to existing Town plans and policies. The Town department responsible for implementation of each strategy is listed in the Mitigation Action Table. If implementation of a particular strategy requires modification to an existing policy, the department listed will be responsible for ensuring that the policy change has been made on or before the target completion date. The policies and programs that will be utilized in implementation of the Hazard Mitigation Plan include the following: Unified Development Ordinance, 2027 Comprehensive Plan, Emergency Operations Plan, Water Conservation Task Force, Building Codes, and Floodplain Regulations. The Community Capability Assessment, found in Appendix C, reviews these policies as well as other policies and programs currently implemented by the Town.



E. PRIORITIZATION METHODOLOGY

An important part of formulating policies to carry out the mitigation strategies is the determination of priority and identification of the potential funding source or sources for each policy. The mitigation objectives were divided into three categories of priority: high, moderate and low. The objectives that were given high priority involve facilities designated as critical by the Advisory Committee. These objectives must be accomplished in order for the Town to recover from disasters as quickly as possible. Moderate priority objectives will speed recovery by limiting damages to non-critical structures and infrastructure. Low priority objectives include natural resource protection and public information projects.

The objectives relating to developing a Hazard Mitigation Plan, maintaining critical facilities and infrastructure, limiting development in flood hazard areas, and preparation of post-disaster clean-up plans are of highest priority. Some of the high-priority objectives are short-term in nature and will be completed within six (6) months of approval of the updated plan. They are continuations of current policies, were identified as deficiencies during the planning process and implemented immediately, or are to be implemented upon approval of the plan. Long-term high-priority objectives are ongoing or are to be completed within five (5) years of the plan's adoption.

The objectives relating to the protection of non-critical structures and infrastructure and informing the public about the potential damages caused by hazards are of moderate priority. The majority of these objectives are continuations of existing Town policies.

Increasing the information available to the public on the Town's website and maintaining and expanding the Town's greenway system were given low priority designation. These projects are continuations of existing Town policies. Although the projects will aid in hazard mitigation to a small degree, other projects such as involving the public in the Hazard Mitigation Planning process and restricting development in the floodplain will be more effective in reducing the impacts of natural disasters.

The funding for the policies and programs listed in the Mitigation Action Table is internal with the following exceptions:



1) Grants may be pursued in order to mitigate damages to existing structures in flood hazard areas and to prepare a debris removal and disposal plan for the Town. 2) Private funding may be used for expansion of the Town's greenway system, maintenance of trees adjacent to power lines (handled by local energy providers) and critical facilities and burial of power lines in new developments.

Most of the mitigation objectives will be completed by Town staff and paid for by the Town. The Town's current budget does not allow for significant expenditures for hazard mitigation, therefore the Advisory Committee reviewed each potential policy along with the Town's capability assessment to verify that the Town had adequate staff and funding necessary to complete the tasks on or before the target date. Funding and staff required to meet all the short-term objectives is currently in place. Funding and staff required for the long-term objectives will be added as necessary, with grants complementing Town resources whenever possible.

